Identifying objects – the ASN.1 approach

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Note, for best viewing, this presentation needs the Dom Casual and Brush Script fonts.

Speakers preamble notes

- (SE)X-rated. Leave now, or shut me up.
- Olivier Dubuisson or Phil Griffin might be better presenters.
- But I was part of the Blood Spilling in 1985: Verbose characters or computer-friendly numerics; new RA or re-use existing ones.
- Everyone likes their own identification scheme (particularly in the MoU!). I am NOT selling ASN.1 OIDs as the universal solution for everything, but they ARE used and useful.
- Dry, boring, not sexy and very simple, with not much to say!

Why the rainbow?

- An infinity of colours
- A secondary rainbow (did you see it?)
- Others to an infinity of internal reflections
- Not really relevant, but it is a nice picture!
- But an infinity of arcs and an infinity of depth is what OIDs are about

The ASN.1 approach to identification

- One of many, many approaches
- Is basically very simple
- Has proved useful in many environments
- Can be used without using ASN.1
- Unfortunately, it is hard to present it in a sexy way!

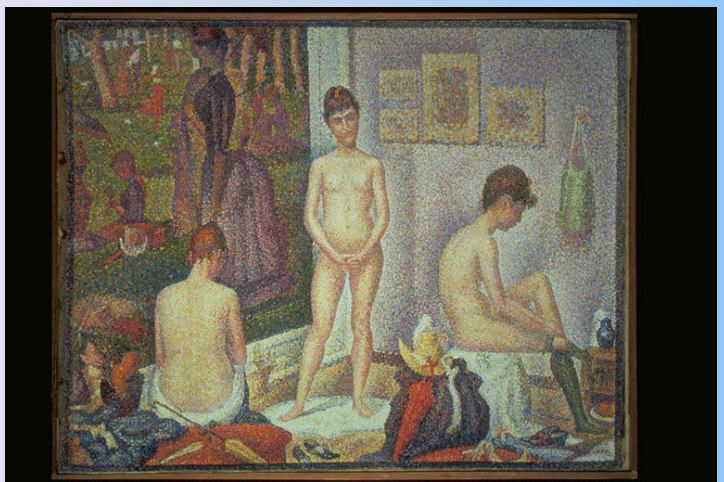
But I will try!

There are many approaches to object identification

- Bar codes are well known
- IP addresses are a binary form
- URLs are well-known
- URNs are less well-known
- NSAP addresses are unused today
- UUIDs are important too

What are the differences?

- Some are character-based, some are binary
- Some need central allocation, others have various levels of hierarchy
- Some are fixed length, others are variable length
- To some extent it is horses for courses
- They all are sisters!



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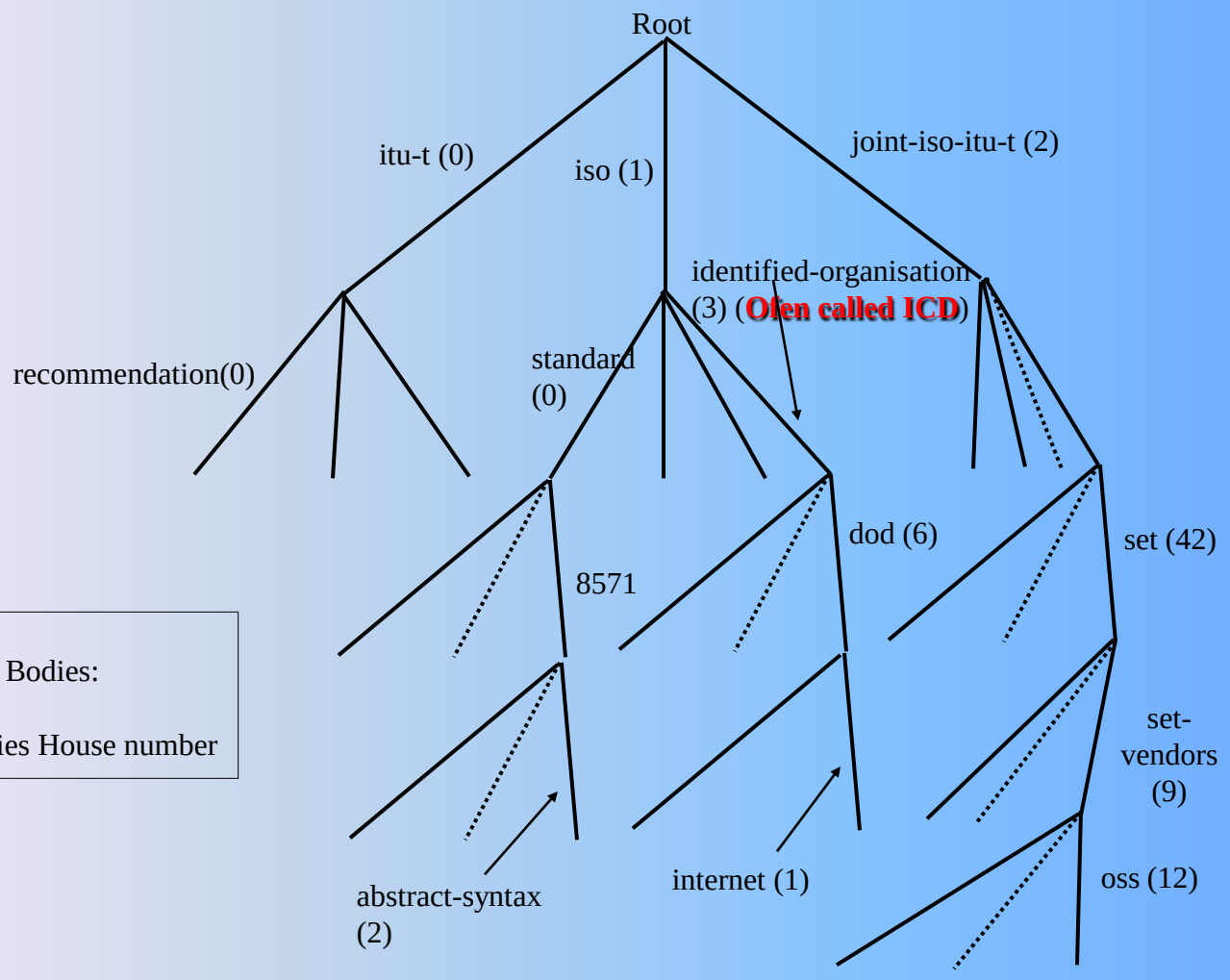
Are OIDs new to the MoU MG?

- No!
- Presented to the Geneva Business Objects Summit in November 2000 by William Lyons
- Banking.ppt

So .. What is the mechanism?

- A hierarchical structure of registration authorities
- An object identifier tree
- Arcs are numbered (zero to infinity)
- Infinitely many arcs from each node
- An RA allocates arcs beneath its node to subordinate RAs, and so on, to an infinite depth
- Objects are identified by the path from the root to a leaf (or intermediate node)

A small part of the OID tree – Get Hung!



ISO:
National Bodies:
BSI:
Companies House number

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Notations and encodings of OIDs

- **Very compact binary encoding (normally used in all computer comms except XML), see next slide**
- **Simplest character encoding (used for XML and other Internet protocols) is (for example)**

  1.0.8571.2.29
- **More readable (for human consumption) is**

  {iso standard 8571 abstract-syntax (2) pci (29) }
- **Or**

  {itu-t recommendation x 1081 pictures (0) leonardo (3)}

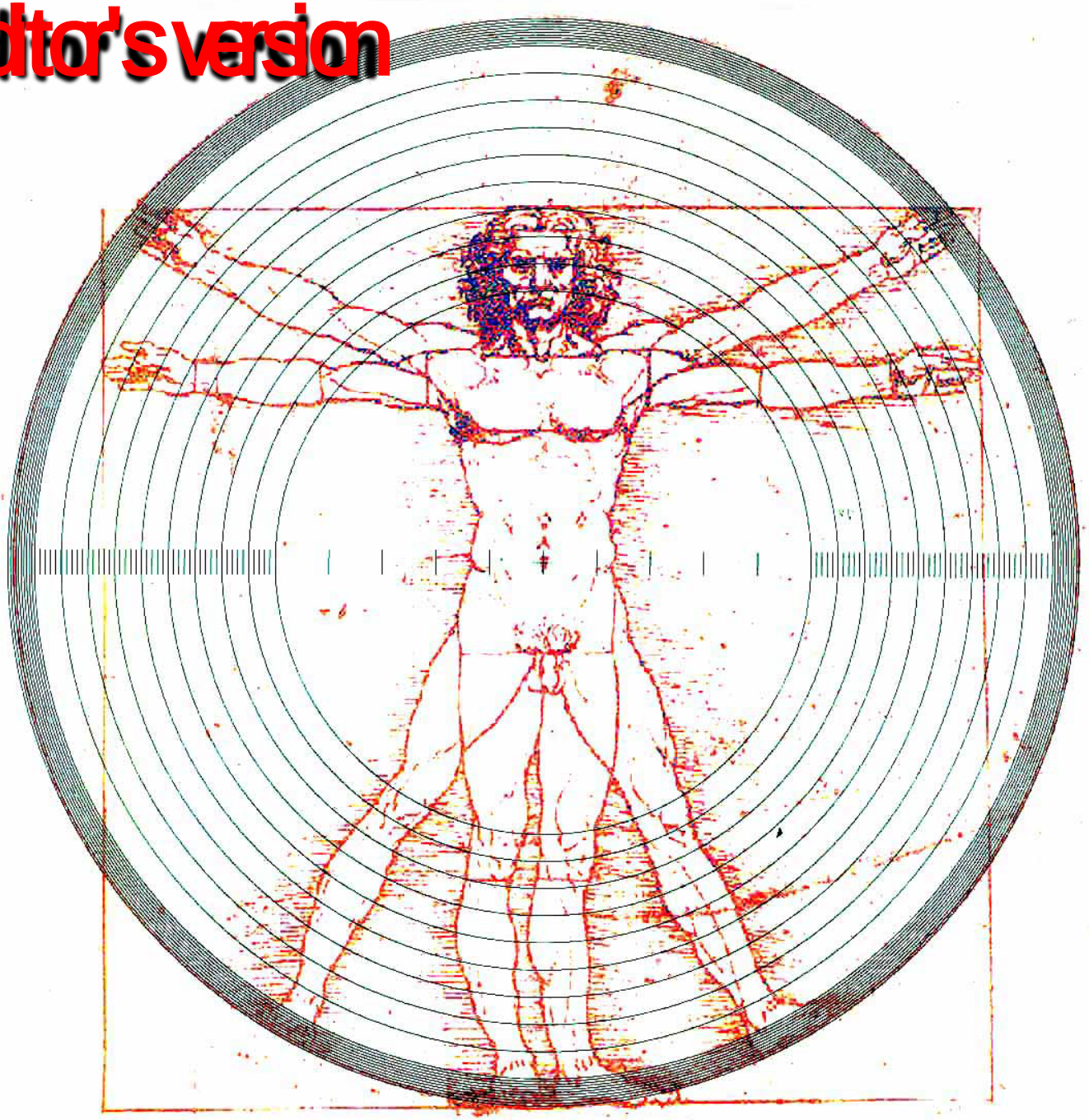
Picture follows!

The binary encoding

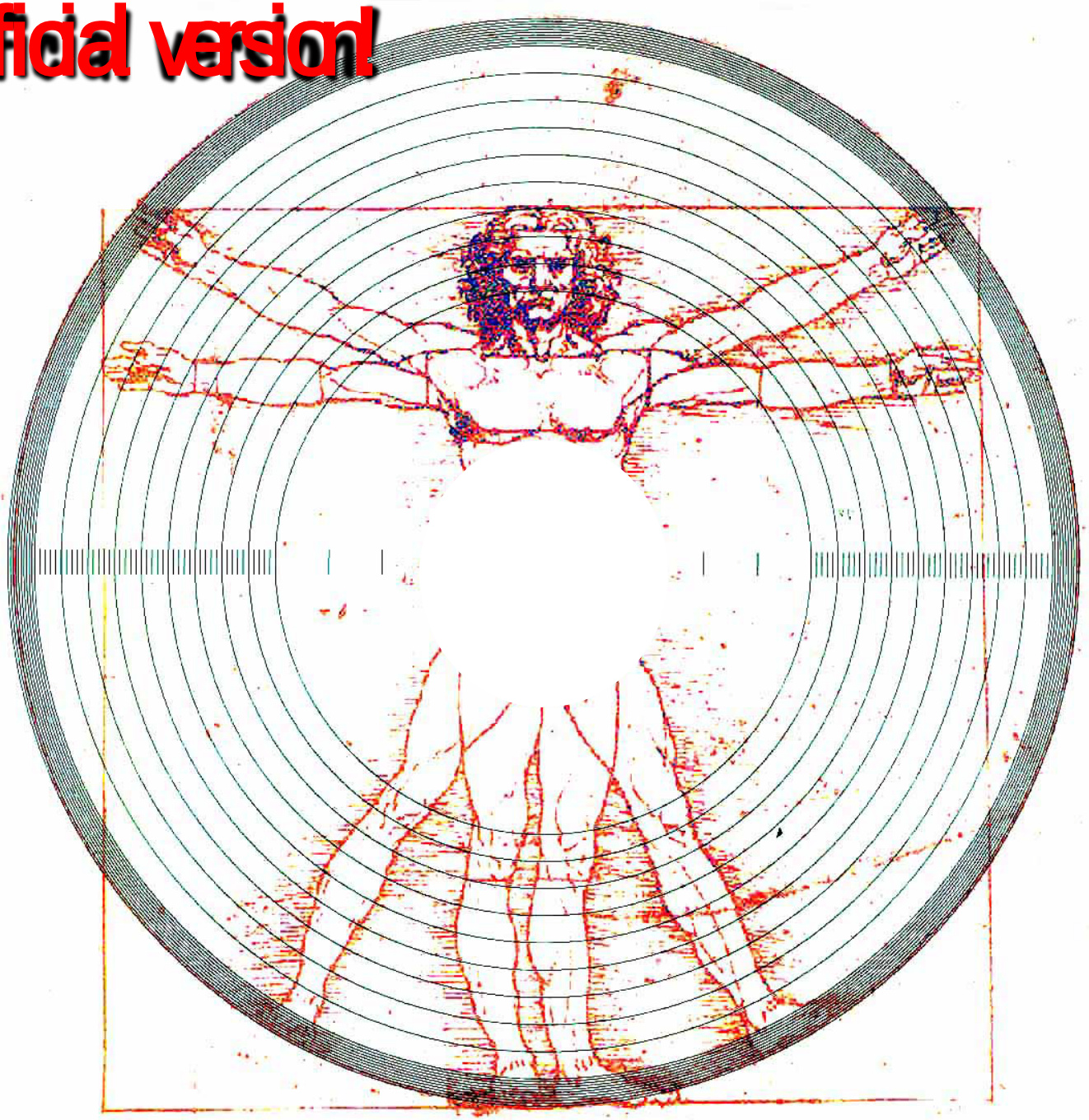
- Roughly one octet per component
- Uses bit 8 as a more bit
- Top two components handled specially
- {0 0} to {0 39} encodes into one octet only
- {1 0} to {1 39} encodes into one octet only
- {2 0} to {2 47} encodes into one octet only
- {2 48} on will use two or more octets

And now the picture!

The Editor's version



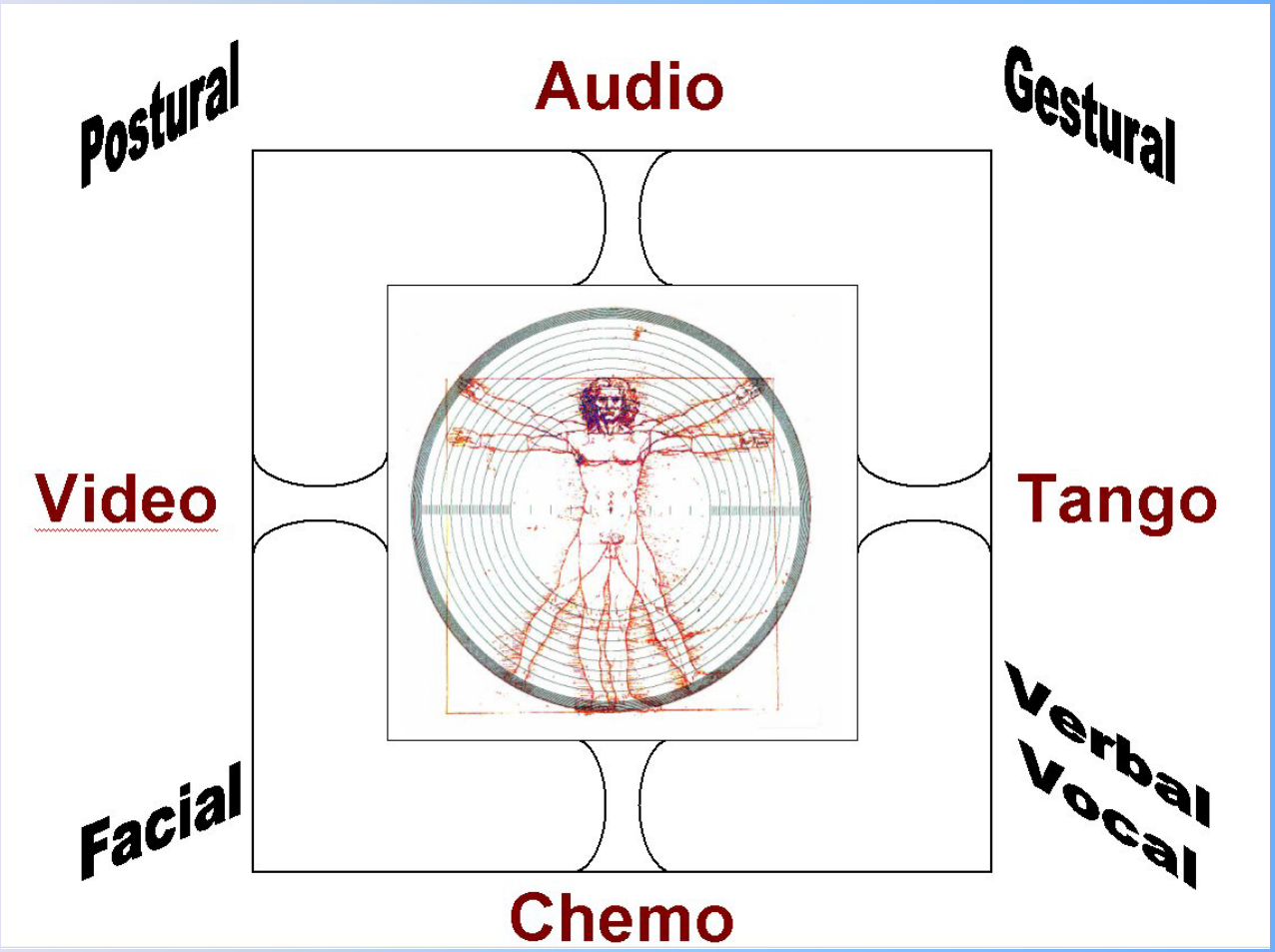
The official version!



But let's see the (two) videos!

- Not much to do with ASN.1 Object Identifiers, but I think interesting!
- Part of the work of ITU-T SG17
- First an introduction by Leonardo himself, then a review of the Recommendation
- (Click on the black display to start the video, and when finished click outside the video area to move to the next slide)

But one more picture first



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Back to OIDs again!

- **Here is an OASIS of tranquillity:**

  {oasis (2) tech-committees (45)
  xcbf(20) standard (0) version (2002)}

  or 2.45.20.0.2002

  or <xxx xmlns="urn:oid:2.45.20.0.2002">…<\xxx>

Artificial – not applied for yet!

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Try another!

- **Facilitation of trade:**

  {un-cefact(2) edi(50) invoice(0) version-2004(2) }

  or 2.50.0.2

  or <xxx xmlns="urn:oid:2.50.0.2">…<\xxx>

Artificial – not applied for yet!

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A real one

- **Face recognition:**

  {iso standard 19794 part(5) version(1) }

  or 1.0.19794.5.1

  or <xxx xmlns="urn:oid:1.0.19794.5.1">…<\xxx>

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ITU-T TSAG Recommendation

- **Was requested to devise a uniform approach for XML namespace specification across all ITU-T Recommendations**
- **Asked SG17 for advice**
- **Was advised to recommend the use of the form:**

<xxx xmlns="urn:oid:0.0.6. ….">…<\xxx>

What about UUIDs?

- Universally unique identifiers
- Verbose – 128 bits (but only = 16 chars)
- ISO/IEC 9834-8 | ITU-T Rec X.667
- Can self-generate OIDs at the rate of about 10 million per second
- Unambiguous over the next 2000 years
- Can optionally register them
- OID is 2.25.xxx…..

Time for another picture!
OIDs provide levels in levels

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All very good, but are they used?

- Not really very much? Depends on comparators!
- Only 59,000 known to be allocated! Certainly many more in reality.
- Telephone numbers will do better!
- But in their field, OIDs have had a pretty good take-up
- See http://oid.elibel.tm.fr

Security algorithm uses of OIDs

- This is one area where OIDs are universally used.
- Use a Digital Certificate, and you use an OID.
  - Secure Hash Algorithm 2 (SHA2)
    { joint-iso-itu-t(2) country(16) us(840)
    organization(1) gov(101)
    csor(3) nistAlgorithm(4) hashAlgs(2)
  - RSA Encryption
    { iso(1) member-body(2) us(840)
    rsadsi(113549) pkcs(1) 1 1 }

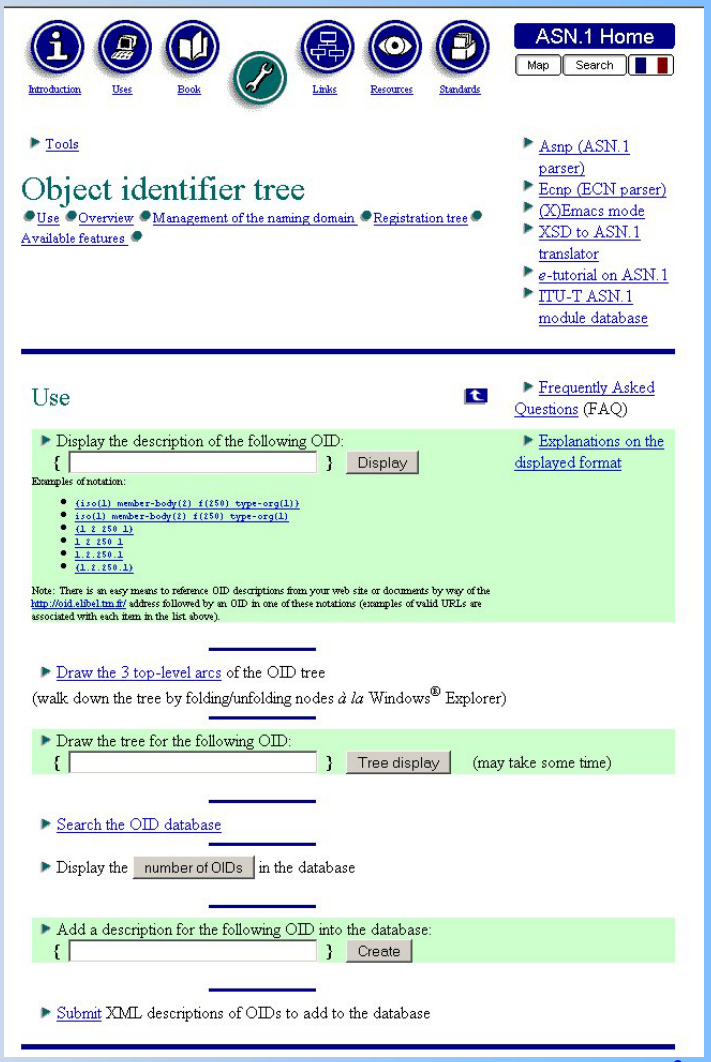
Other areas

- Many ITU-T Recommendations
- Biometrics and other ISO Standards
- Many US ANSI X.9 specifications
- US Banking specifications
- UPU and international carrier parcel tracking
- 3GPP Mobile phones
- Not as widespread as bar-codes, but heavily used in computer communications protocols

Web support

- Go to http://oid.elibel.tm.fr
- Number of OIDs
- Details about an OID
- Provide details about a (new) allocation of an OID
- Much additional information

The Elibel OID page



Introduction | Uses | Book | Links | Resources | Standards

ASN.1 Home

Map | Search

▶ Tools

Object identifier tree

Use • Overview • Management of the naming domain • Registration tree • Available features •

- Asnp (ASN.1 parser)
- Ecnp (ECN parser)
- (X)Emacs mode
- XSD to ASN.1 translator
- *e*-tutorial on ASN.1
- ITU-T ASN.1 module database

Use

▶ Frequently Asked Questions (FAQ)

▶ Display the description of the following OID:
{ } Display

▶ Explanations on the displayed format

Examples of notation:

- {iso(1) member-body(2) f(250) type-org(1)}
- iso(1) member-body(2) f(250) type-org(1)
- {1 2 250 1}
- 1 2 250 1
- 1.2.250.1
- {1.2.250.1}

Note: There is an easy means to reference OID descriptions from your web site or documents by way of the http://oid.elibel.tm.fr/ address followed by an OID in one of these notations (examples of valid URLs are associated with each item in the list above).

▶ Draw the 3 top-level arcs of the OID tree
(walk down the tree by folding/unfolding nodes *à la* Windows® Explorer)

▶ Draw the tree for the following OID:
{ } Tree display (may take some time)

▶ Search the OID database

▶ Display the number of OIDs in the database

▶ Add a description for the following OID into the database:
{ } Create

▶ Submit XML descriptions of OIDs to add to the database

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Near Futures

- Web services (SOAP and all that) support to register or obtain UUID-based OIDs
- Fast Web services support
- Courtesy of the ITU-T TSB, France Telecom, Sun Microsystems, and OSS Nokalva

Requests for top-level allocations

- Formally, contact the ITU-T TSB or ISO/IEC SC6 Secretariat, for the attention of the ASN.1 Rapporteur, in both cases.
- Informally, contact j.larmouth@salford.ac.uk

MoU MG Recommendations?

- ASN.1 object identifiers should be considered alongside other existing identification mechanisms, particularly when there is a need for:
  - simple globally unambiguous identification
  - allocation of identifiers by many organizations
  - hierarchical not centralized allocation mechanisms
  - compact binary encodings of the ID
- MoU member organizations should consider obtaining a top-level allocation (see the OASIS and UN/CEFACT examples above)

How to end?

- OIDs provide a standardised, distributed, low admin overhead, flexible, hierarchical system for object identification, with few restrictions
- They provide efficient binary, simple numeric, and human readable representations
- Is it too much to say that they are a shining light?

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